

ABSTRACT OF THE DISCLOSURE

A guided wave radar measurement instrument comprises a probe defining a guided wave radar transmission line. A pulse circuit is connected to the probe for generating a very fast stream of pulses on the transmission line and receiving reflected pulses returned on the transmission line. The reflected pulses represent a characteristic of a material being measured. An equivalent time sampling circuit is connected to the pulse circuit operable to sample reflected pulses to build a time multiplied picture of the reflected pulses and comprises a ramp generator circuit generating a saw tooth ramp signal used to selectively delay sampling reflected pulses to build the time multiplied picture. In one aspect of the instrument, the saw tooth ramp signal has a controlled ramp start for each cycle and retrace at an end of the cycle. A processing circuit is connected to the equivalent time sampling circuit for selectively controlling ramp start for each cycle and measuring round trip travel time for a pulse from the pulse circuit.